MOM Quickstart Guide

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Brief instructions for running MOM5 experiments

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1. Where to start?

A good place to start is the "doc" directory, where you will find "user" guides for the MOM. The full documentation of MOM appear are bundled as separate files and can be download from GFDL GForge.

2. How to get the source code and scripts

You can get the tar ball for source code by logging into your GFDL GForge account and navigate to the Files section of MOM project area. Then you need to untar the tar bundle and cd to the resulting directory. For convenience, this directory will be referred to as the `ROOT` directory. A README file in the `ROOT` directory will tell you the contents of each subdirectory under `ROOT`.

In the sections below, `test_case` is a generic name referring to the name of a specific experiment you are working on.

After you expand the tar bundle you get a directory which will be referred to as root_dir in this guide.

3. How to compile and run the MOM tests

MOM requires that NetCDF and MPI libraries be installed on users' platform. Ensure that you have the right environment variable for your platform in the file bin/environs.YOUR_PLATFORM_ID YOUR_PLATFORM_ID could be any string that identifies your platform. The file bin/environs.YOUR_PLATFORM_ID gets sourced at the beginning of all compile and run scripts and is there to make sure all compile and run time library paths are found.

There are a few types of test models provided for this release all using the GFDL shared infrastructure (FMS) but have different FMS component models for atmosphere and/or land. We refer to these types as MODEL_TYPE in this guide:

• MOM_solo : stand alone MOM ocean model.

• MOM_SIS : MOM coupled with GFDL ice model (SIS) besides null versions of atmosphere and land mod-

els.

- EBM : MOM_SIS coupled with land_lad and energy balanced atmosphere model

- ICCM : MOM_SIS coupled with land_lad and bgrid atmosphere model in low resolution setup.

- CM2M : GFDL CM2.1 model which is MOM_SIS coupled with land_lad and finite volume atmosphere model (with am2 physics).

- ESM2M : GFDL Earth System Model which is MOM_SIS coupled with land_lad2 and finite volume atmosphere model (with am2 physics).

To compile the models: Find out what MODEL_TYPE you want to work on and what is YOUR_PLATFORM_ID then

```
> cd root_dir/exp

> ./MOM_compile.csh --platform YOUR_PLATFORM_ID --type MODEL_TYPE
```

NOTE: The Energy Balanced Model (EBM) cannot be compiled by the above procedure and a separate compile script is provided for it.

To run an experiment

- Make sure you have a large enough working directory (WORKDIR) and made a symbolic link to it called "work" in your top directory. I.e.,

```
> cd root_dir

> ln -s YOUR_LARGE_WORK_DIR work
```

- Find out what test cases are available for a particular MODEL_TYPE

```
> ./MOM_run.csh --platform YOUR_PLATFORM_ID --type MODEL_TYPE -h
```

- To run a TEST_CASE

```
> ./MOM_run.csh --platform YOUR_PLATFORM_ID --type MODEL_TYPE  --experiment TES
```

- If you do not have the right input data in the WORKDIR for the TEST_CASE the above command would ask you to download it and try again.

- You may need to specify the number of processor for the TEST_CASE, in that case the above command errors out with the right info

- Note: The script exp/preprocessing.csh is called by the MOM_run.csh to modify the mom4p1 namelists of these old test cases to make them compatible with mom5.

- The results go into WORKDIR

4. Notes

The scripts have been tested fully only with Intel Fortran and PGI compilers on ia64 platform. They are partially tested with pathscale compiler on x86_64 and also gfortran4.3 compiler on Core2Duo processor.

Some of these test cases require a large disk space to save the input data. Choose a partition with enough space (1-2 G) to untar the code and data bundels.

IBM platform users might want to add the following line to the top of the run scripts

```
setenv LDR_CNTRL MAXDATA=0xD0000000@DSA
```

The compile script provides the basic capability with dynamic memory allocation. To use static memory allocation which might be faster on some platforms you need to adjust the values of domain bounds properly according to the number of processors and layout.

The compile script use netcdf3 by default. If you want to use netcdf4 libraries instead you can do so by deleting the "-Duse_netCDF3" from the CPPs in compile script and then recompile.

5. How to prepare input data

The input data needed to run the selected experiments (tests) that are included in this release are available via anonymous ftp [ftp://ftp.gfdl.noaa.gov/perm/MOM4/mom_pubrel/exp/]. Note that data in `ASCII, HISTORY, RESTART` directories are *NOT* needed for running experiments. They are the outputs of the experiments and are provided for the purpose of comparing your results with results produced at GFDL.

Tools are provided so that users can create data from scratch for their own experiments. For more details refer to `ROOT/src/preprocessing`.

6. Examine the output

To keep the runscript simple all output files of a model run will be in the work directory. There are three types of output files:

• ascii file with `.fms.out` extension: the description of the setup of the run and verbose comments printed out during the run.

• restart files in `RESTART` directory: the model fields necessary to initialize future runs of the model.

• history files with `.nc.tar` extension: output of the model, both averaged over specified time intervals and snapshots.

The ascii file contains everything written to the screen during model execution. The total time for model execution as well as the times of separate modules are reported here. All `.tar` files should be decompressed for viewing. The decompress command is:

```
tar -xvf filename.tar
```

Users will see result files in NetCDF format. Postprocessing tools such as Ferret, ncview, grads or matlab can be used to view data in these files.

The outputs of the selected experiments are provided on GFDL ftp site [ftp://ftp.gfdl.noaa.gov/perm/MOM4/ mom_pubrel/exp] for the purpose of comparing your results with results produced at GFDL.